Amendments to the Drawings:

The attached drawing sheets include FIGS. 2 and 3 have been amended to delete the term "AXU" from the figures.

Attachment: 2 Replacement Sheets

REMARKS

Claims 1-18 are currently pending, with claims 1, 6 and 7 being in independent form. Claims 1-10 have been amended. Claims 11-18 have been added. The specification has been amended. The Abstract of the Disclosure has been amended. The drawings have been amended. The amendments to claims 1, 2, 4-7, 9 and 10 clarify the wording of the claims, and are cosmetic in nature. No new matter has been added. Reconsideration of the application, as amended, is respectfully requested.

Claims 3 and 8 were objected to based on certain informalities. In response to the objections, Applicant has amended claims 3 and 8 in a manner that is believed to address each specific objection. Reconsideration and withdrawal of the objections to the claims are respectfully requested.

In the September 13, 2006 Office Action, independent claims 1, 6 and 7, and dependent claims 2-5 and 8-10 were rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,639,916 ("*Wakizaka*") in view of U.S. Patent No. 6,414,970 ("*Negishi*"). For the following reasons, Applicant respectfully asserts that all claims of the present application are patentable over the cited references.

The claimed invention relates to a W-CDMA based telecommunication network, an asynchronous transfer mode (ATM) switch in such a network and a method for processing data in such a network.

The network defined by amended claim 1 comprises the following features:

A. The telecommunication network uses the W-CDMA protocol;

B. The telecommunication network comprises a plurality of base stations;

C. The plurality of base stations communicate with a central Radio Network Controller (RNC) by an ATM based data connection via an I_{ub} interface;

D. At least one of the plurality of base stations comprises a plurality of radio sectors having physically distributed AAL-2 based termination points;

E. Each termination point has an AAL-2 over ATM structure where different call ID's are mapped into respective ATM virtual connections (ATM/VC) under the control of a control unit timer having a determined delay time; and

F. An ATM switching unit that receives all AAL-2 cell streams being sent parallel to each other.

Amended independent claim 1 further comprises the following feature:

G The ATM switching unit comprises a multiplexing unit for multiplexing AAL-2 connections of different termination points into a single ATM virtual connection to be processed by the ATM switch.

Thus, amended claim 1 includes "an ATM switching unit that comprises an ATM switch" and, additionally, "a multiplexing unit [that is] capable of multiplexing AAL-2 connections".

In contrast to the disclosed prior art, where the ATM switch is only capable of performing multiplexing at the ATM protocol layer (i.e. multiplexing of ATM virtual connections), Applicant's claimed ATM switching unit comprising the additional multiplexing unit is configured to perform multiplexing at the AAL-2 protocol layer (i.e. multiplexing of AAL-2 connections). Such a difference is illustrated in Figs. 2 and 3 of the originally filed specification, which depict a prior art network as described in the originally filed specification (Fig. 2) and the network in accordance with the present claimed invention (Fig. 3), respectively.

In the prior art network disclosed in Fig. 2 of the specification, each base station, for example, comprises four sectors, where only one base station with four sectors is depicted, and in each sector/at each termination point of a base station, multiple calls with different call IDs are mapped into an ATM virtual connection via AAL-2 in a "control unit" (i.e., "AAL-2" in Fig. 2) within certain time constraints. These calls are, for example, established with mobile terminals, where physical communication with the mobile terminals occurs via transmitter (Tx), receiver (Rx) and an antenna. Here, the mapping is accomplished by mapping data from the calls into AAL-2 cells (minicells) and then stacking these AAL-2 cells, which are smaller than ATM cells, into ATM cells. The thus obtained ATM cell stream is then transported to the ATM switch via a UTOPIA interface. In this case, the ATM switch is only capable of performing switching at the ATM layer, i.e. only ATM virtual connections stemming from different termination points/sectors can be switched.

In particular, such a prior art ATM switch is not capable of accessing the AAL-2 cells that are contained in the ATM cells of the ATM cell streams stemming from the different termination points/sectors. Consequently, if during the mapping of data from the calls with different call ID's into ATM cells at each termination point/sector it is impossible to completely fill up the ATM cells with AAL-2 cells, due to timing constraints such that dummy data has to be

inserted into the ATM cells instead, then it will be impossible for such an ATM switch to remove the inserted dummy data. As a result, the ATM stream output by the ATM switch, which is bound for the RNC, will be rather inefficient because the ATM cells contained in this ATM stream contain a large amount of dummy data.

In contrast, with reference to Fig. 3 of the specification, Applicant's claimed network further comprises a multiplexing unit, e.g., "AAM CPS MUX". This multiplexing unit is configured to perform multiplexing at an AAL-2 layer, i.e. the claimed multiplexing unit can perform multiplexing of AAL-2 connections related to all termination points/sectors of a base station by extracting the AAL-2 cells from the AAL-2 over ATM cell streams received from different termination points/sectors and multiplexing them into a single ATM virtual connection, which is then switched by an ATM switch and subsequently transported to the RNC. As a result, any dummy data contained in the ATM cell streams received from the termination points/sectors can be removed, which vastly increases efficiency. Amended independent claim 1 includes an ATM switching unit comprising the multiplexing unit (MM CPS MUX) and the ATM switch for achieving this result.

Fig. 4 of Applicant's specification is a block diagram illustrating exemplary functionality associated with the claimed invention. With reference to Fig. 4, the first ATM cells of three respective ATM cell streams related to three sectors (termination points) of a base station are depicted on the "left side" of the block diagram (e.g., partially filled cells). The first ATM cell of the ATM cell stream of sector #1 contains data from calls with call ID 1 and 2 (i.e., CID-1 and CID-2) in the form of AAL-2 cells, the first ATM cell of the ATM cell stream of sector #2 contains data from calls with call ID 3 (CID-3) in the form of AAL-2 cells, and the first ATM cell of the ATM cell stream of sector #3 contains data from calls with call ID 4, 5 and 6 (CID-4, CID-5 and CID-6) in the form of AAL-2 cells. In each of the three depicted first ATM cells, an insufficient amount of data (AAL-2 cells) to completely fill up the ATM cells is present due to timing constraints imposed during the mapping of data from calls with different call ID's to ATM cells. As a result, dummy data is inserted to fill up the ATM cells instead. In accordance with the prior art network, when receiving three such first ATM cells, the conventional ATM switch can only create an ATM cell stream containing the three first ATM cells one after the other, where the contents of the ATM cell streams remain unchanged.

In contrast, in accordance with the claimed invention and as depicted on the "right hand" side of Fig. 4 (e.g. filled cells), placement of the multiplexing unit at a location prior to the ATM

switch (see Fig. 3) permits access to the single AAL-2 cells (i.e., CID-1 to CID-6) contained in the received ATM cells of the different termination points/sectors and permits reassembly of them into densely packed ATM cells in which dummy data does not remain. Consequently, the ATM cell stream output by the ATM switch and destined for the RNC via the I_{ub} interface is much more densely packed and thus more efficient as compared to prior art.

The Examiner concedes *Wakizaka* fails to teach the claimed invention. *Negishi* has been cited to provide what *Wakizaka* lacks, i.e., "a control unit timer that is common in any multiplexer". However, the combination of *Wakizaka* and *Negishi* fails to teach or suggest amended independent claim 1. *Wakizaka* relates to a method for communicating using an asynchronous transfer mode adaptation layer (ATM AL) receiving unit (see col. 1, lines 9-10). *Wakizaka* (col. 1, lines 60-63) teaches that AAL type 2 ("AAL2"), which can collectively include data to be transmitted from a plurality of users and which have different destinations, is used to avoid large amounts of vacant areas in a payload when an ATM cell is used for sending data of a single user, and when the amount of the data is much less than the payload in the ATM cell. *Wakizaka* (col. 2, lines 1-3) teaches that AAL2 cells are normally used when voice information is transferred.

In essence, the technique disclosed in *Wakizaka* is founded on a base station in a Wideband Code Division Multiple Access (W-CDMA) system that provides terminating units for both standard ATM cells and AAL2 cells, and proposes a solution to reduce the amount of required hardware. *Wakizaka* (col. 8, line 20 thru col. 10, line 8; Fig. 8) teaches one embodiment of the system that relates to a radio base station 38 with an AAL receiving circuit 2 and radio units $23_1 \ldots 23_n$. *Wakizaka* (col. 8, lines 28-31) teaches the AAL receiving circuit 2 includes an AAL identifying unit 3, a standard cell interchanging unit 4, an AAL2 assembling unit 5, a cell multiplexer (MUX) 6 and AAL terminating units 7_1 to 7_n.

Wakizaka (col. 9, lines 1-34; Fig. 11) teaches a flow chart describing the functionality of the first embodiment. *Wakizaka* (col. 9, lines 3-7) states, "when an ATM cell is entered from the ATM exchange 1 to the radio base station 38 via the ATM transmission line 10, the AAL receiving circuit 2 identifies an AAL type of the entered ATM cell at the AAL identifying unit 3". *Wakizaka* (col. 9, lines 7-8) further states, "this identifying process is done by referring to a VCI in a header of the ATM cell. *Wakizaka* (col. 9, lines 8-11) states, "it is determined whether the ATM cell is an AAL2 cell or a standard ATM cell according to a value of the VCI in the

ATM cell. When the entered ATM cell is determined as a standard cell, the ATM cell is simply transferred to the cell multiplexer 6 via the standard cell interchange unit 4".

Wakizaka (col. 9, lines 16-21) teaches the steps of terminating the process and an assembling process associated with ATM cells. *Wakizaka* (col. 9, lines 22-26) teaches the steps associated with appending an ATM header to each of the assembled ATM cells and formatting the assembled cells. *Wakizaka* (col. 9, lines 26-32) teaches that the assembled ATM cells are sent to the cell multiplexer 6, multiplexed, and supplied to the common ATM bus 9. Lastly, *Wakizaka* (col. 9, lines 32-34) teaches that the AAL2 terminating units 7_1 ... 7_n perform AAL processing of the supplied cells according to their AAL type.

Wakizaka, however, fails to teach or suggest features C, F and G, as recited in amended independent claim 1. Firstly, *Wakizaka* fails to teach or suggest feature C, i.e. base stations that communicate with a central Radio Network Controller (RNC) by an ATM based data connection via an I_{ub} interface. *Wakizaka* (col. 1, lines 23-26) teaches that an "exchange" is an ATM switch. Thus, *Wakizaka* fails to support the Examiner's assertion that the item 1 "exchange" shown in Fig. 8 constitutes Applicant's claimed RNC.

Even assuming *arguendo* that a person having the ordinary level of skill in the art could draw certain conclusions about the structure of a transmission circuit for radio base station 38 based on what is taught in Fig. 8 of *Wakizaka* with respect to feature E of claim 1, Applicant respectfully asserts that there is nothing in *Wakizaka* that would even provide the skilled person with the motivation to conclude from Fig. 8 that AAL-2 streams would be sent in parallel to an ATM switch, as required by feature F of amended claim 1. In fact, it is not even readily clear how a corresponding transmission circuit would be configured due to the rather complicated structure of multiplexer 6, standard cell interchanging unit 4, AAL2 assembling unit 5 and AAL identifying unit 3 in AAL receiving circuit 2 in Fig. 8 of *Wakizaka*. Moreover, the multiplexer 6 in Fig. 8 of *Wakizaka* comprises only 2 inputs and 1 output, where only the lower input (i.e., the input associated with mobile station 20_2) of the two inputs is connected to the AAL2 assembling unit 5. Therefore, *Wakizaka* fails to teach or suggest that parallel AAL2-cell streams are received by multiplexer 6, since only one input related to an AAL2 connection is disclosed therein.

Finally, *Wakizaka* fails to teach or suggest feature G of claim 1. The Examiner contends multiplexer 6 of Fig. 8 constitutes Applicant's claimed "multiplexing unit" in accordance with feature G. However, the multiplexer 6 disclosed in Fig. 8 of *Wakizaka* obviously fails to

multiplex AAL2 connections into a single ATM virtual connection to be processed by an ATM switch. *Wakizaka* clearly teaches that the multiplexer 6 only multiplexes standard ATM cells, but not AAL2-cells, which is readily apparent from Figs. 10A and l0B of *Wakizaka*. *Wakizaka* (col. 3, line 62-65 and col. 8, line 58-67) teaches that AAL2 cells are converted to standard ATM cells in the AAL2 assembling unit 5. *Wakizaka* thus teaches that standard ATM cells are present at both inputs of the multiplexer 6 and, consequently, that the multiplexer 6 can only multiplex standard ATM cells but not AAL2 cells (or "AAL2 connections").

Furthermore, *Wakizaka* (Fig. 8) clearly teaches that multiplexer 6 is incapable of multiplexing connections into a single ATM virtual connection, since the output of multiplexer 6 is fanned out into a plurality of virtual ATM connections to the plurality of AAL terminating units $7_1 \ldots 7_n$, where this plurality of virtual ATM connections is appropriately denoted as "ATM bus" 9. In addition, there is nothing in *Wakizaka* to teach or suggest just how such a single ATM virtual connection is to be "processed by an ATM switch", in the manner defined by feature G of amended independent claim 1. Therefore, *Wakizaka* fails to teach or suggest independent claim 1 as amended, for at least this additional reason.

Negishi, on the other hand, relates to a digital signal multiplexing method and apparatus for multiplexing digital picture and speech signals to generate degree-one multiplexed television-program-based streams, and degree-two multiplexing these plural degree-one multiplexed streams to generate a degree-two multiplexed stream to transmit or record the generated degree-two multiplexed stream. However, *Negishi* in combination with *Wakizaka* fails to achieve the claimed network recited in amended independent claim 1. *Negishi* (col. 10, line 65 thru col. 11, line 4; Fig. 9) teaches a first embodiment in which "the system clocks Cpl to Cpn, accorded to the degree-one multiplexers 2*a* to 2*n*, respectively, and system clocks Cr, generated by the clock generator 7, are not synchronized with one another, such that time management is performed independently for the degree-one multiplexers 2a to 2n and the degree-two multiplexer 3". However, *Negishi* is silent with respect to features C, F and G recited in amended independent claim 1 and, thus fails to cure the deficiencies of *Wakizaka*.

Moreover, the problems associated with mapping the features of amended independent claim 1 to the first embodiment disclosed in *Wakizaka* clearly illustrate that the features of claim 1 relate to an entirely different subject matter than that which is disclosed in *Wakizaka* and *Negishi*. In particular, claim 1 is directed to a transmission circuit, i.e. the situation where user-originating calls are to be transferred from AAL-2 based termination points to the RNC. In such

a scenario, fixed-length ATM cells are used for transporting data to an ATM switch, and then further to an RNC via the I_{UB} interface, and tight timing constraints encountered within the context of voice data. As a result, a large amount of ATM cells is transmitted without being completely filled up with data. To overcome this problem, independent claim 1 includes, in an ATM switching unit, a multiplexing unit that first multiplexes the AAL2 cells into a single ATM virtual connection, which is then processed by the ATM switch. *Wakizaka* and/or *Negishi* fail to teach or suggest the processing associated with such a claimed feature. In view of the foregoing, amended independent claim 1 is patentable over the combination of *Wakizaka* and *Negishi* and, thus, reconsideration and withdrawal of the rejection under 35 U.S.C. §103 are respectfully requested, and a notice to that effect is earnestly solicited.

Independent claim 6 is the ATM switch associated with the network defined by independent claim 1. Independent claim 6 is the method associated with the network defined by independent claim 1. Therefore, independent claims 6 and 7 are patentable over *Wakizaka* and *Negishi*, individually or in combination, for the reasons discussed above.

In view of the patentability of independent claims 1, 6 and 7, for the reasons set forth above, dependent claims 2-5 and 8-10, as well as new dependent claims 11-18, are all patentable over the prior art.

Based on the foregoing amendments and remarks, this application is in condition for allowance. Early passage of this case to issue is requested.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
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